System Trust and Cooperation: The Case of Recycling Behavior

Rompf, Stephan Alexander

University of Cologne, GESSCDSS / University of Mannheim

4 July 2014

System Trust and Cooperation:

The Case of Recycling Behavior

Working Paper, this version: July 4th 2014

Abstract:

In this paper, I develop and test the hypothesis that system trust – trust in the reliability, effectiveness, and legitimacy of social institutions – promotes cooperation in social dilemmas and the provision of public goods, focusing then on the example of recycling. I discuss three models that can explain recycling behavior (rational choice, low-cost hypothesis, dual-process theory) and show how they link incentives and attitudes. All three models claim that incentives are an important factor mediating the attitude-behavior link, but they develop contradicting hypotheses about the direction of this effect. I use survey data collected by Sønderskov and Daugbjerg (2011) to advance an empirical test.[1] I find a positive and significant interaction between the attitude of system trust and recycling costs, as well as a negative and significant interaction between system trust and recycling benefits. The data rule out the rational choice and low-cost hypothesis explanation of recycling behavior. Instead, they indicate that attitudes moderate the impact of the incentive structure, increasing cooperation in collective action dilemmas irrespective of the costs associated with compliance.

Keywords: system trust, cooperation, recycling, rational choice, low-cost hypothesis, adaptive rationality

--- COMMENTS AND SUGGESTIONS ARE HIGHLY WELCOME ---

Author Information:

Stephan Alexander Rompf

Institute of Sociology and Social Psychology (ISS)
University of Cologne
Albertus-Magnus-Platz
50923 Köln

Tel.: +49-(0)221-470-7888
Web: https://uni-koeln.academia.edu/StephanAlexanderRompf
E-Mail: trust_research@gmx.de

[1] I gratefully acknowledge access to the data granted by Kim M. Sønderskov and Carsten Daugbjerg. The data was collected for the research project Public Policies and Demand for Organic Food (COP), funded by ICROFS (DARCOF III). The particularities of the data set and measurement details of the COP survey are discussed in their paper.

1. Introduction

In the face of global warming and increasing resource scarcity, the intelligent use of raw materials has become a prime concern in the organization of modern economic activity. Recycling, that is, the re-processing of used materials and waste into new products, has a potential to reduce resource consumption, energy usage, greenhouse-gas emission, and air- and water-pollution by lowering the need for conventional waste disposal. The organization of efficient recycling systems has thus risen in public interest and concern (Stern 2007, IPCC 2007).

However, individual recycling vividly illustrates a typical collective action dilemma. Individual participation in voluntary recycling programs and the adoption of recycling behavior helps to cut resource consumption and improve the environment. But the final outcome can be enjoyed by anyone, whether he or she recycles or not. In other words, recycling is a public good; its provision depends on the successful cooperation of a large number of individuals.

In this paper, I develop and test the hypothesis that *system trust* – trust in the reliability, effectiveness, and legitimacy of social institutions – can foster cooperation in social dilemmas and promote the provision of public goods, such as recycling. An actor who maintains a high level of system trust assumes that the actions of others are effectively regulated and structured by the prevalent norms and rules within the social system (McKnight et al. 1998). Importantly, this includes the expectation that norm violations are effectively sanctioned; with high system trust, norm enforcement is taken-for-granted. If this is true, then the presence or absence of system trust should be important to cooperation because it influences the perception of punishment and sanctioning mechanisms.

Moreover, system trust can be regarded as an important part of the prevalent *culture of trust* in a society. System trust rests on the assumption that other actors in the social system do equally trust in it. It therefore provides a background of normality on which routine collective

action can unfold (Möllering 2006). Apart from sensitizing actors towards the institutional sanctioning and punishment potential, it also encourages them to regard the *status quo* normative order as legitimate. That is, high system trust may shape compliance to norms, institutional regulations and procedures because social institutions, when regarded as taken-for-granted and legitimate, incline actors to keep conformity to the "rules of the game" across different contexts. System trust, in this sense, may work akin to an intrapersonal stable trait, or "meta-norm," that influences the overall probability of norm-compliance. In essence, persons high in system trust more readily cooperate because "that is what one ought to do."

Yet, while the importance of system trust to the functioning of modern societies is commonly emphasized in theory, few studies have linked it to individual action and choice; empirical evidence connecting system trust to cooperation is sparse. The aim of the present study is threefold: first, it provides a long-missing theoretical explanation for the impact of system trust on individual action and choice. Second, it delivers an empirical assessment of the effect of system trust on collective action. Third, and most importantly, the paper presents a comparative test of three different theoretical models explaining the link between attitudes and behavior, relating to the attitude of system trust and recycling behavior in particular. In recent years, the empirical instability of the attitude-behavior link has stirred increasing concern among researchers (see Kroneberg et al. 2010, Mehlkopp & Graeff 2010).

To explore the role of system trust on individual action in a collective action dilemma, the study relies on a unique survey that was designed to assess the role played by trust in pro-environmental behavior in four countries (see Sønderskov & Daugbjerg 2011). This survey assesses self-reported measures of recycling behavior and includes survey indicators of system trust, which will be used to test three models explaining cooperation and recycling.

Section 2.1 shortly introduces the concept of system trust. Section 2.2 presents a theoretical link between system trust and collective action. I argue that system trust can be influential because it directs actors towards the sanctioning and punishment potential of institutions. When a situation is defined as one being under social control, this may lead to unconditional cooperation, even in a social dilemma situation such as recycling. I then proceed in section 2.3 to look at a more general question which has plagued environmental research: there is a tremendous variation in the magnitudes and correlations between environmental attitudes and environmental behavior. I discuss several theoretical models (rational choice, low-cost hypothesis, dual-process theory) that can explain why the link between attitudes and behavior is unstable. Importantly, these frameworks claim that the incentive structure is an important mediating factor of the attitude-behavior link. Yet, they imply contradicting hypotheses which can be tested against each other. Sections 3 and 4 develop and conduct a comparative empirical test to model and explain recycling behavior.

2. Theory and Hypotheses

2.1. System Trust and Cooperation

System trust refers to abstract institutions or social systems as *objects* of trust.[2] It is created and sustained by the continual, ongoing, and confirmatory experience of a social system's functioning. In contrast to interpersonal trust, system trust does not concern social uncertainty with respect to another's action or a generalized expectation of trustworthiness. It addresses the global characteristics of social institutions: their primary goals, legitimacy, structure, and operation, and the effectiveness of the sanction mechanisms which structure and control interactions in the social world (Zucker 1986, Giddens 1990). Trust researchers regard system trust as an indispensable ingredient to the smooth functioning of social systems in modern

[2] Another term commonly used is *institutional trust,* which is identical in meaning and concept.

society. It warrants a constant reproduction of social systems in everyday interactions and their aggregation into stable social structure (Lewis & Weigert 1985a, b).

System trust ultimately depends on a form of generalized trust, or "trust in trust" (Luhmann 1979: 66f.). That is, it rests on the assumption that other actors in the social system do equally trust in it. An actor who maintains a high level of system trust believes that the actions of other actors in the system are structured by institutionalized norms, rules, and procedures. Importantly, system trust increases the expectation that norm violations will be punished; it focuses the actors on the sanctioning potential of institutions (Shapiro 1987, Misztal 1996, McKnight et al. 2001). With high system trust, norm enforcement is taken for granted.

At the same time, the basis of system trust is the appearance of normality (Luhmann 1979: 22, Lewis & Weigert 1985a: 463, Misztal 2001). This indicates that there is a link joining system trust to the concepts of familiarity and confidence: system trust situationally manifests in the form of taken-for-granted background assumptions, that is, in familiarity with, and confidence in, the functioning of the system and its primary goals, rules, and procedures (McKnight et al. 1998, Möllering 2006). If an actor believes that a social institution is effectively sanctioning free-riding behavior, then norm-compliance is often regarded as a default strategy and sanctions become a tangible threat. In sum, high system trust adds to the perceived validity and legitimacy of institutions and institutional control; it also creates situational normality and taken-for-grantedness, which lay the ground for routine behavior.

2.2. Linking Trust to Collective Action

However, the presence or absence of system trust alone does not explain cooperation in a collective action dilemma. To understand how it can promote collective action, I here extend an argument proposed by Sønderskov (2011), who in his work establishes a link between *generalized social trust* and the *social exchange heuristic* (Yamagishi et al. 2007). Principally

speaking, the social exchange heuristic is an evolutionary adaptation of the human organism for facilitating social exchange, a "cognitive bias that perceives free riding in a situation as neither possible nor desirable" (ibid. 10). If activated, it prevents the subjective perception of opportunities for defection.

As Sønderskov argues, generalized social trust promotes a positive expectation of trustworthiness and, coincidentally, one of reciprocal cooperation. In this way, it increases the likelihood of the activation of the social exchange heuristic, and thereby motivates individuals to cooperate even in social dilemmas. Empirically, Sønderskov finds a consistent main effect of social trust on recycling behavior.

At the same time, the activation of the social exchange heuristic crucially depends on the sanctioning potential of institutions and the costs of detection and punishment that come along with free-riding, and in fact take precedence over "expected cooperation." According to Yamagishi et al. (2007), the social exchange heuristic is activated by cues that hint at the presence of a situation of social exchange. Actors are assumed to make subjective inferences about the state of the world, and evaluate the potential errors of this inference process. Importantly, the inference process is unconscious and automatic, and *it is concerned with the question of whether or not free riding is likely to be detected, and whether or not punishment is a credible threat* (ibid: 264f.). If the threat of sanctioning and punishment is credible, then this automatically activates the social exchange heuristic. In short, whenever a situation is defined as being under social or institutional control, the alternative of defection is simply excluded from perception. This leads actors to automatically cooperate in social dilemmas and provide resources and effort to the production of a public good such as recycling.

This establishes a theoretical link between system trust and the activation of the social exchange heuristic: system trust influences our perception of institutional control and norm en-

forcement, and it promotes a view that the normative orders found in the life-world are legitimate. This effect may matter even in contexts where a factual sanctioning is unlikely to occur, or punishment mechanisms are virtually absent, because actors *subjectively define* a situation accordingly. For example, the threat of being detected as a "recycling free rider" and the associated punishment costs are, except for very severe breaches of regional recycling regulations, often minimal. But in influencing the probability of the heuristic activation independently of the specific context, system trust leads to more cooperation nevertheless; in the applied case, it should positively affect recycling behavior. Actors with a high level of system trust are, in a sense, "biased" towards perceiving situations as being under social or institutional control. More generally speaking, I argue that system trust can work akin to an intrapersonal "meta-norm" that amplifies and boosts norm-conformity over and above the effect of the specific attitude, norm, or rule in a specific context. With respect collective action, I hypothesize that high system trust positively influences recycling behavior.

2.3. Explaining Environmental Behavior: Low-Costs or Adaptive Rationality?

Past research has also documented that the cost- and opportunity structure is important for recycling behavior (Steg & Vlek 2009). However, the SEH framework cannot explain how these parameters relate to cooperation and recycling. In essence, these structural parameters do neither indicate social exchange nor punishment and detection contingencies as such. Therefore, they are not addressed by the heuristic and the inference process around which it is centered. In the following, I discuss three alternative models that can accommodate both factors and provide a theoretical basis to derive hypotheses about the interplay of attitudes and the cost-benefit structure of a public good problem.

A widely accepted baseline model that puts a theoretical underpinning on a "main" effect of the cost-benefit structure on recycling behavior is traditional rational choice (RC) theory. RC models explain behavior as a result of rational choice among alternatives which, given pref-

erences, constraints and beliefs, actors weigh and evaluate in order to choose the alternative which satisfies their preferences best and maximizes their expected utility (Gintis 2007). According to this framework, an actor engages in recycling and waste separation only if the expected utility of recycling, minus the costs associated with it, exceeded that of conventional waste disposal. Thus, RC predicts a negative effect of recycling costs, and a positive effect of recycling benefits. In the "wide" interpretation of RC (Opp 1999), attitudes can also enter the utility of the actor in the form of an intrinsic utility that is derived from attitude-conform behavior, or in the form of intrinsic costs from cognitive dissonance in the case of attitude-inconsistent behavior. Note that a standard RC model predicts *additive effects* of the cost-benefit structure and intrinsic factors, such as attitudes and internalized norms, and no interaction effect.

A different view on the interplay between attitudes and the incentive structure of recycling is provided by the "low-cost-hypothesis" (Diekmann & Preisendörfer 2003). According to the low-cost-hypothesis, attitudes and norms influence behavior in low-cost situations only. The additional costs that derive from norm-compliance or attitude-consistent action must be evaluated relative to the alternatives of defection and attitude-inconsistency. This is equivalent to postulating a negative effect of the costs associated with following a norm or attitude. With respect to recycling behavior, the low-cost hypothesis assumes that an increase in recycling costs may induce a shift to conventional waste disposal, once the costs of recycling become too high. This does not add to the RC perspective. But in addition, the low-cost-hypothesis is often used to justify and predict an interaction effect: a "specific" version of the model assumes that the effect of attitudes *decreases* with *increasing* costs of norm compliance (Best & Kroneberg 2012). As the costs increase, the impact of the attitude or norm becomes less significant to the choice of action; the probability of norm-compliance decreases. This is equiva-

lent to claiming a *negative interaction effect* between attitudes and the cost-structure of the situation.

A third explanatory model is based on social-psychological dual-process theories. The most important difference to RC models and the low-cost-hypothesis is the assumption that a high match or "fit" between an accessible attitude and situational cues can trigger an *automatic* activation of the attitude or norm, together with its associated cognitions, affects and behavioral dispositions (see Chaiken & Trope 1999). In other words, dual-process models predict that norms and attitudes can immediately lead to consistent behavior without a rational evaluation of costs and benefits, given that situational cues indicate their appropriateness and the norm or attitude is highly accessible to the actor. To model this aspect of *adaptive rationality*, I use the Model of Frame Selection (Esser 2001, Kroneberg 2011, see Kroneberg 2010 for a brief introduction), a formalized version of dual-process accounts which provides a tractable modeling of the key components and their interrelations.

Contrasting a rational to an automatic mode, the *mode-selection threshold,* which governs the activation of either information processing mode during interpretation and choice, depends on the following parameters:

- Opportunity p (time, cognitive capacity)
- Motivation U ("utility of appropriateness" and opportunity cost of inference errors)
- Cognitive effort and costs C
- Chronic accessibility a_j of a script that regulates action (i.e. a norm or attitude)

In a simplified version of the MFS (Kroneberg et al. 2010), the mode-selection threshold defines the *parameter conditions for the activation of the automatic mode* in the form of an inequality. If unfulfilled, the rational mode will be activated:

$$a_j > 1 - C / (p * U)$$

Among other things, this threshold postulates that, as the chronic accessibility a_j of an internalized norm or attitude increases, the activation of the automatic mode becomes more likely. *Vice versa*, this decreases the probability of selecting the rational processing mode. With high accessibility, a controlled evaluation of costs and benefits action becomes less likely, leading to automatic, attitude-consistent behavior. In other words, the model predicts a *decreasing* effect of instrumental incentives, such as material costs or benefits, with *increasing* attitude strength or norm internalization. With respect to recycling behavior, this amounts to predicting a decrease of cost effects with increasing attitude strength, and thus to predicting a *positive* interaction between recycling costs and system trust. When system trust is high, costs do not matter to the actors anymore. Then, actors unconditionally cooperate in the collective action dilemma irrespective of the costs associated with compliance. Note that the predicted sign of this effect is opposed to the sign predicted by the extended low-cost-hypothesis. More importantly, the two models postulate different underlying mechanisms that explain the proposed interactions: based on the low-cost hypothesis, behavioral costs moderate the effect of attitudes. In contrast, in the MFS framework, attitudes moderate the effect of behavioral costs and, more generally speaking, that of instrumental incentives.

Note that the MFS framework and the process of mode-selection can also be used to explain the activation of the social exchange heuristic. From the perspective of adaptive rationality, heuristic activation can be reconstructed as a problem of defining a situation as a cooperative and communal exchange. Thus, we can re-think the social exchange heuristic as a special aspect of the "framing" a situation, a fundamental and ever-present aspect of cognition. However, the principles of adaptive rationality equally apply to the activation of situational taxonomies, or "frames," just as they govern the activation of attitudes, norms and other "scripts." Stated in this way, a link between system trust and recycling behavior can also be established: system trust influences the framing of the collective good dilemma. Actors with high system

trust more readily frame the situation of waste disposal as one that is under institutional control and legitimate, leading to higher levels of norm compliance and routine conformity, and thus preventing a rational consideration of the costs and benefits associated with it.

2.4. Summary of Hypotheses

I have argued above that system trust is an important factor governing the activation of the social exchange heuristic; it focuses actors on the sanctioning potential and threat of punishment that comes from social institutions and also provides the ground for routine conformity. Actors with high system trust are pushed towards recognizing the recycling dilemma as being under institutional control, which activates the social exchange heuristic and promotes public good provision and cooperation:

H1: Actors with high system trust recycle more readily than actors with low system trust (positive main effect).

Concerning the impact of the cost-benefit structure, Sønderskov (2011) tests the hypothesis that an effect of social trust only exists when actors perceive the recycling dilemma as a collective action problem, since generalized perceptions of other´s trustworthiness only then become truly relevant. In contrast, the social exchange heuristic and generalized social trust should not matter when recycling is perceived as having private benefits. Thus, he proposes an interaction between generalized social trust and public good perception. He uses an item with the following question to operationalize the perception of a public good dilemma: "If I couldn't recycle, it would be difficult for me to dispose of all my refuse." When reverse-coded, this item measures the presence or absence of *private benefits* of recycling, and thus operationalizes an aspect of the cost-benefit structure of the collective action dilemma.

The main effect of benefits can be explained from the rational choice perspective: all else being equal, private benefits should encourage recycling behavior, their absence decrease it.

According to the adaptive rationality perspective, this effect is counterbalanced by high system trust, which can trigger automatic compliance irrespective of whether or not private benefits accrue. Generally speaking, the impact of instrumental incentives is expected to decrease with increasing accessibility of a norm or attitude. Thus, we can also predict an interaction effect that is opposite in sign to that of private benefits:

H2: The perception of recycling as a means to obtain private benefits increases recycling behavior (positive main effect, rational choice).

H2a: The positive effect of private benefits on recycling behavior is moderated by system trust: high system trust decreases instrumental concerns stemming from private recycling benefits. With high system trust, benefits are irrelevant (negative interaction, MFS).

Concerning the effects of recycling costs and system trust, all three models which were discussed in section 2.3 unequivocally predict a negative main effect of the costs associated with recycling. In short, an increase in recycling costs decreases the probability of recycling behavior:

H3: Recycling costs decrease recycling behavior (negative main effect).

On the other hand, the rational choice, low-cost- and adaptive-rationality models each predict a unique interaction between recycling costs and system trust in their effect on recycling behavior. The models yield the following concurrent hypotheses, which can be compared:

H3a: The effects of recycling costs and system trust are additive (no interaction, RC).

H3b: The (positive) effect of system trust decreases with increasing recycling costs (negative interaction, low-cost hypothesis).

H3c: The (negative) effect of recycling costs decreases with increasing system trust (positive interaction, adaptive rationality).

All in all, the theory discussed here provides a solid theoretical underpinning of attitudinal influences on recycling, which were developed here for the specific measure of system trust. The three models can guide a re-analysis of the recycling survey data. To test the hypotheses discussed above, I rely on a unique survey about recycling and organic-food consumption which was conducted in four different countries: Denmark, Sweden, UK and USA.

3. Data and Method

3.1. Measures

The dependent variable *recycling behavior* is measured using three items measuring paper, battery and electronics recycling activity (see Sønderskov & Daugbjerg (2011) for a detailed discussion of the COP Survey data-set and Appendix A2 for items and coding procedures). Subjects could indicate how much a share of their waste they recycle on a five-point Likert-type scale. Recycling behavior will be constructed as the normalized mean of the three questions, ranging between zero and one.

System trust (*ST*) will be measured using five questions that prompt the respondent to rate how much he "personally trusts each of the following institutions," asking then to rate on a ten-point Likert-type scale (0="no trust at all"; 10="complete trust") how much the respondent trust the legal system, parliament, police, civil service, and government. Factor analyses confirm that these items measure a single dimension and that the scale is internally consistent (one factor retained with EV: 3.18, Cronbach´s alpha: 0.89). System trust will be constructed as the normalized mean of these items, ranging between zero and one.

To operationalize the cost-benefit structure of the collective action dilemma, I use two questions from the survey. First, I use a measure of "recycling convenience" to operationalize the

absence of recycling costs. The item asks whether the local recycling options are "worse than in most other places." Respondents who agree to this question face fewer recycling opportunities and incur larger costs (travel distance, effort, time) when deciding to recycle. The variable is coded such that higher values correspond to *better* recycling opportunities, and therefore represent *lower* costs. A reverse-coded version of this variable codes a true cost effect, and costs will be normalized to a range between zero and one.

With respect to recycling *benefits*, Sønderskov (2011) argues that generalized social trust should not matter when recycling has direct private benefits, in contrast to a "pure" public good situation. However, note that the item used to operationalize the private-versus-public perception of recycling ("If I couldn't recycle, it would be difficult for me to dispose of all my refuse.") is truly asking for the presence of private recycling benefits. It does not allow for the additional conclusion of whether or not recycling is perceived as a collective good dilemma. From the rational choice and adaptive rationality perspective, it appears reasonable to interpret this variable as accruing to recycling *benefits* as a part of the incentive structure of the collective action dilemma. The item is coded such that higher values display higher private benefits, once more normalized to the range between zero and one (see Appendix A2).

3.2. Controls

The following variables are introduced into the analyses: environmental values, age, gender, educational level, income, ethnic minority, place of residence (city size), and trust in recycling authorities (see Sønderskov 2011). In addition, all models were re-calculated after introducing generalized social trust and environmental concern as additional controls. The results do not change when these variables are included.

4. Empirical Analysis

Table 1 assesses the effects of system trust on recycling behavior (see table 1). Model I does not include interaction effects. It can be used to test hypotheses H1, H2, and H3. First, *system trust* (ST) increases the probability of recycling, not rejecting H1. Obviously, whether or not institutional trust is high influences the probability of recycling. With respect to the social exchange heuristic explanation, this can be regarded as providing a link between system trust and its activation: people with high system trust are more prone to activating the heuristic and contributing to the public good than low system trustors. From the adaptive rationality perspective, the result can be regarded as providing evidence that the accessibility of generalized attitudes towards society´s institutions, their legitimacy and punishment potential prompts actors towards adopting norm-compliant behavior whenever these attitudes are accessible. Secondly, Model I demonstrates a consistent effect of the cost-benefit structure, in line with H2 and H3. For one, *private benefits* (PB) that accrue from recycling increase recycling activity. It decreases when it recycling is not a necessary means of disposing waste. At the same time, *convenience of recycling* (CR) positively influences the probability of recycling. Note that the variable is coded here to represent the absence of cost. It is therefore estimated positive. From the estimation results, one can conclude that the presence or absence of recycling costs is an important factor in determining the adoption of recycling. If actors do *not* face additional costs, recycling behavior increases.

Table 1: Testing H1-H3.

Model	I	II	III	IV (costs)	V (alt. costs)
System Trust (ST)	0.072***	0.129***	0.226***	0.027	0.140***
	(0.027)	(0.043)	(0.062)	(0.051)	(0.045)
Private Benefits (PB)	0.088***	0.145***	0.154***	0.155***	0.155***
	(0.014)	(0.037)	(0.037)	(0.037)	(0.037)
Convenience of Recycling (CR)	0.139***	0.139***	0.242***	-0.248***	-0.248***
	(0.016)	(0.016)	(0.040)	(0.040)	(0.040)
Interactions					
ST x PB	-	-0.108*	-0.125*	-0.127*	-0.127*
		(0.065)	(0.065)	(0.065)	(0.065)
ST x CR	-	-	-0.199***	0.199***	0.209***
			(0.070)	(0.070)	(0.071)
Control Variables	(insignificant estimates omitted from table)				
Environmental Values	(Reference: Materialist)				
Mixed	0.031***	0.031***	0.032***	0.032***	0.032***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Postmaterialist	0.038**	0.039**	0.037**	0.037**	0.037**
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
Trust Recycling	0.057***	0.057***	0.054***	0.054***	0.054***
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Age	0.003***	0.003***	0.003***	0.003***	0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Income	0.047**	0.048**	0.046**	0.046**	0.046**
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
Generalized Trust	-	-	0.063**	0.063**	0.064**
			(0.028)	(0.028)	(0.028)
Country	(Reference: Sweden)				
Denmark	-0.033**	-0.033**	-0.030**	-0.030**	-0.030**
	(0.015)	(0.015)	(0.015)	(0.030)	(0.015)
UK	-0.297***	-0.296***	-0.296***	-0.293***	-0.293***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
US	-0.425***	-0.424***	-0.424***	-0.420***	-0.420***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Constant	0.485***	0.454***	0.388***	0.620***	0.506***
	(0.038)	(0.043)	(0.048)	(0.046)	(0.043)
N	2935	2935	2935	2935	2935
R^2	0.414	0.415	0.417	0.417	0.416

Notes: Method OLS. *, **, ***: p< 0.1, 0.05 and 0.01, respectively (two-sided). Standard errors in parentheses.

Model II tests H2a, the hypothesis of an interaction between private benefits and system trust. This prediction can be established from the adaptive rationality model: the effect of private benefits vanishes with increasing system trust. In other words, instrumental concerns become less important when a relevant attitude is accessible. Model II reveals interesting results: both

the coefficients of ST and PB increase when including the interaction term, showing that their conditional effects are large when the other variable is zero. At the same time, the interaction ST x PB is significant and negative, pointing towards a diminishing effect of PB with increasing system trust. This interpretation is also suggested by the MFS, which predicts a decreasing effect of instrumental variables with increasing attitude or norm accessibility. The data are in line with H2a.

Model III is estimated to test H3a,b,c and discriminate between a rational choice explanation, a low-cost-hypothesis explanation, and an adaptive rationality explanation of recycling behavior. The results rule out H3a and H3b, which predict either a zero or a positive interaction between the convenience of recycling and system trust.[3] The data support the adaptive rationality hypothesis: the effect of recycling convenience and recycling benefits, that is, of the two main incentive variables, disappears with increasing attitude accessibility. Model IV re-estimates model III using a reverse-coded CR variable. It then displays a real negative cost effect, and the sign of the main- and interaction effects consistently change. A difference in results is visible in the effect of ST, now estimated positive but insignificant. This difference arises from the change of the reference category to which the estimated conditional main effects accrue (and see below).

[3] Keep in mind that hypotheses H3a,b,c in section 2.4 were formulated with respect to recycling costs. The empirical test in Model III uses the convenience of recycling for a test. Using convenience instead of recycling costs, a positive interaction is expected under H3b. Models III to V additionally control for generalized trust (correlations with ST = r~0.51).

Figure 1: Marginal effects of private benefits and recycling costs by system trust.

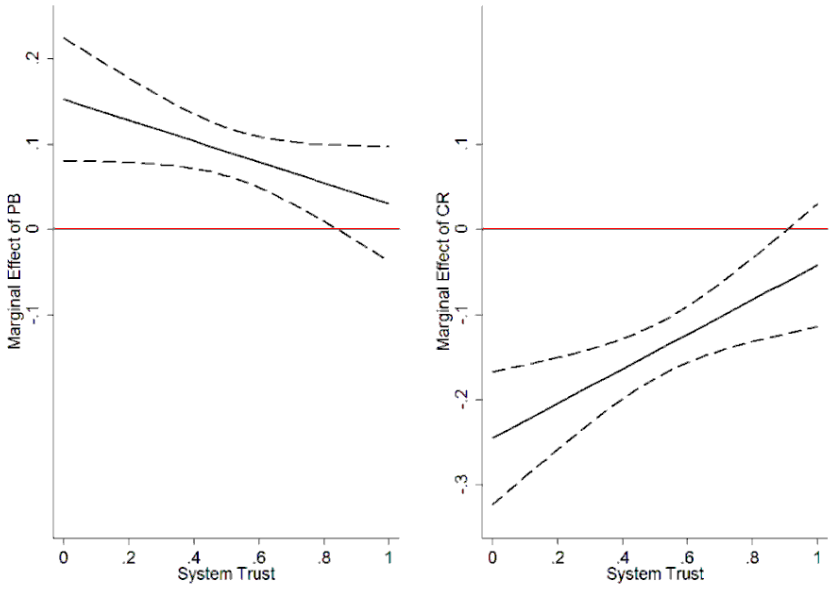

Figure 1 uses Model IV to graphically analyze the predicted marginal effects of the cost-benefit variables while varying system trust and holding all other variables constant at their mean. As can be seen from the graph, the marginal effects of the two instrumental variables approach zero and become insignificant at the 5%-level when system trust increases. The marginal effect of PB decreases from 0.15 ($p<0.001$) to 0.03 ($p=0.38$), the marginal effect of recycling costs decreases from -0.24 ($p<0.001$) to -0.04 ($p=0.26$). Overall, these results point towards a dual-process explanation of the attitude-behavior link: attitudes, when accessible, moderate the impact of the incentive structure.

To assess the robustness of these results, model III was re-estimated on individual country samples. As can be seen from table A1 (see Appendix), the effect of system trust is stable across national contexts, although the *p*-values drop with reduced sample sizes. In the country-level data, a main effect of system trust cannot be found in the United States ($\beta = 0.14$, p

< 0.31).[4] At the same time, recycling benefits have an effect more than twice as large as in Denmark, Sweden or the UK. Furthermore, the US is the only country where interactions between either of the incentive variables with system trust cannot be found. As a preliminary conclusion, to be evaluated in future studies, one could infer that direct incentives are most important and system trust is irrelevant to environmental action in the US. This result could be explained by a difference in national recycling systems (the US is the only country in the sample that has no nation-wide legal acts and regulations to organize recycling) in combination with a particular understanding about the role of the state in the US public. Secondly, while there is a strong and robust effect of convenience of recycling and a clear pattern of interaction with system trust in all countries, this result does not hold for the case of recycling benefits. This indicates that, in the case of recycling, the direct costs associated with action are of more practical relevance for the human actors than individual benefits.

As a second robustness check, model V re-estimates model IV with an alternative measure of recycling costs. As it is, the design of the study is purely correlational, and a potential bias of the estimates can occur if the predictors of the model are not truly independent. In an exploration of this issue (not presented here), it was found that respondents with low system trust also report higher recycling costs than the sample average. This effect disappears with increasing system trust, suggesting a non-linear relationship between the two variables. Estimating, in a first stage, a model in which the predictors *ST* and *(ST x ST)* are used to predict *CR* reveals a significant influence of both variables, verifying such a non-linear relationship. This first-stage model explains about 2.5 per-cent of the total variability in the cost variable. In model V, the residuals of this regression were used as an alternative cost measure to represent the "true" cost effect which is unrelated to any systematic influence of system trust. Im-

[4] Another means to assess the robustness of results is to re-estimate the models using ordered logit specifications. These models do not yield substantially different results, and importantly, the fundamental relations among predictors remain significant at comparable levels.

portantly, neither of the other model variables changes in sign or significance, reassuring that the relationships among the model variables are stable. What is more, a conditional effect of system trust is now revealed as strongly positive and significant.

5. Conclusion

Taking things together, the data allow for a comparative test of the rational choice approach, the low-cost-hypothesis, and a dual-process model. All three models explain recycling behavior, but they predict a different sign of interaction between attitudes and incentive structure. Using the COP survey data, I have tested these predictions. The analysis points to the validity of a dual-process perspective of environmental action. That is, instrumental concerns such as costs and benefits, which have long been found to influence environmental behavior, may be outweighed by strong attitudes that "take over" and govern action, once an attitude or norm is highly internalized and chronically accessible. In this paper, I have focused on system trust, a general attitude about the validity, legitimacy and effectiveness of modern institutions. I have argued that system trust may work akin to a "meta-norm," guiding the probability of participation in cooperative action dilemma situations because it furnishes the activation of the social exchange heuristic. This argument, initially brought forth by Sønderskov (2011), was adapted to the case of system trust. In contrast to generalized social trust, system trust addresses the perception of social and institutional control, sanctioning and norm-enforcement, and thus important factors governing heuristic activation. Note that system trust itself is not a "norm." I argue that it is an ever-present aspect (or "module") of frames in general, which actors use akin to a "meta-norm" when defining a situation. In essence, actors high in system trust are more prone to framing situations as being under social and institutional control, and this effect transpires into diverse social behaviors, such as cooperation in a public good dilemma and recycling.

The effects of system trust on norm-compliance are considerable and moderate the effect of the incentive structure. Comparing the low-cost and the dual-process model, the current results contradict the low-cost explanation. While this approach predicts a decreasing effect of attitudes with increasing behavioral costs, the dual-process account predicts a decreasing effect of behavioral costs with increasing attitude or norm accessibility. The empirical results are in line with this prediction.

There are several practical implications for policy and intervention. First, with respect to the effects of system trust *per se*, this study directly reveals how important system trust is for individual action and compliance. The study provides a micro-foundation on the claim that system trust enhances social system stability and forms the "glue" of modern societies. It was shown that high system trustors more readily engage in norm compliant action. In the case of voluntary recycling schemes, this means that actors recycle even when they face additional costs and irrespective of private benefits from it. Future studies need to investigate this connection between system trust and compliance. Principally, if system trust turns out to work akin to a "meta-norm," increasing the overall probability of norm-compliance, then a direct practical implication for policy would be to increase system trust, that is, citizen´s trust in modern social institutions whenever a social dilemma has to be solved.

With respect to environmental policy and intervention, it would be interesting to investigate whether more specific attitudes and norms (i.e. environmental concern and pro-environmental attitudes) can elicit similar effects with respect to recycling and other forms of pro-environmental behavior (see already Best & Kneip 2011). If this turns out to be true, one policy implication would be to devise informational strategies that aim at changing pro-environmental perceptions, knowledge, norms and attitudes so as to heighten awareness of environmental problems and increase knowledge of behavioral alternatives and their pros and cons. A change of attitudes may be beneficial to the efficiency of recycling systems and relat-

ed institutional solutions for environmental protection. Moreover, providing information about the behavior of others, for example, through public participation and involvement, or *via* descriptive norms could support environmental behavior by increasing attitude and norm accessibility, and by directly changing the probability of social exchange heuristic activation. What is more, this study provides evidence for the fact that the incentive structure can pose an external barrier to pro-environmental action. Structural intervention strategies should aim at changing contextual factors such as the availability of opportunities and the factual costs and benefits of environmental action, for example, by providing feasible and closing undesired alternatives, devising legal regulations which are met with some type of enforcement and punishment, or decreasing the price of pro-environmental behavior. These interventions all aim at altering the incentive structure of the collective dilemma in favor of the pro-environmental solution, and towards successful public good provision. These strategies may be especially relevant for individuals with low norm- or attitude accessibility, for example, a low level of system trust.

References

Best, Henning, and Thorsten Kneip. 2011. "The Impact of Attitudes and Behavioral Costs on Environmental Behavior: A Natural Experiment on Household Waste Recycling." *Social Science Research* 40:917-930. Best, Henning, and Clemens Kroneberg. 2012. "Die Low-Cost-Hypothese: Theoretische Grundlagen und Empirische Implikationen." *Kölner Zeitschrift für Soziologie und Sozialpsychologie* (forthcoming).

Chaiken, Shelly, and Yaacov Trope. 1999. *Dual-Process Theories in Social Psychology*. New York, London: The Guilford Press.

Charness, Gary, and Martin Dufwenberg. 2006. "Promises and Partnership." *Econometrica* 74(6):1579-1601.

Diekmann, Andreas, and Peter Preisendörfer. 2003. "Green and Greenback: The Behavioral Effects of Environmental Attitudes in Low-Cost and High-Cost Situations." *Rationality and Society* 15(4):441-472.

Esser, Hartmut. 2001. *Soziologie. Spezielle Grundlagen. Band 6: Sinn und Kultur*. Frankfurt a. Main (a.o.): Campus.

Giddens, Anthony. 1990. *The Consequences of Modernity*. Stanford, CA: Stanford University Press.

Gintis, Herbert. 2007. "A Framework for the Unification of the Behavioral Sciences." *Behavioral and Brain Sciences* 30(1):1-61.

Kroneberg, Clemens. 2011. *Die Erklärung sozialen Handelns. Grundlagen und Anwendungen einer integrativen Theorie*. Wiesbaden: VS Verlag.

Lewis, J. David, and Andrew J. Weigert. 1985a. "Social Atomism, Holism, and Trust." *The Sociological Quarterly* 26(4):455-471.

Lewis, J. David, and Andrew J. Weigert. 1985b. "Trust as a Social Reality." *Social Forces* 63(4):967-985.

Luhmann, Niklas. 1979. *Trust and Power*. Chichester (a.o.): John Wiley & Sons.

McKnight, Harrison D., Larry L. Cummings, and Norman L. Chervany. 1998. "Initial Trust Formation in New Organizational Relationships." *Academy of Management Review* 23(3):473-490.

Mehlkop, Guido and Peter Graeff. 2010. "Modeling a Rational Choice Theory of Criminal Action: Subjective Expected Utilities, Norms, and Interactions." *Rationality and* Society 22(2):189-222.

Misztal, Barbara A. 1996. *Trust in Modern Societies*. Cambridge: Polity Press.

Misztal, Barbara A. 2001. "Normality and Trust in Goffman´s Theory of Interaction Order." *Sociological Theory* 19(3):312-324.

Möllering, Guido. 2006. *Trust: Reason, Routine, Reflexivity.* Amsterdam (a.o.): Elsevier.

Opp, Karl-Dieter, 1999. "Contending Conceptions of the Theory of Rational Action." *Journal of theoretical Politics* 11(2):171-202.

Shapiro, Susan P. 1987. "The Social Control of Impersonal Trust." *American Journal of Sociology* 93(3):623-658.

Sønderskov, Kim M. 2011. "Explaining Large-N Cooperation: Generalized Social Trust and the Social Exchange Heuristic." *Rationality and Society* 23(1):51-74.

Sønderskov, Kim M., and Carsten Daugbjerg, 2011. "The State and Consumer Confidence in Eco-Labeling: Organic Labeling in Denmark, Sweden, The United Kingdom and The United States," *Agriculture and Human Values* 28 (4), 507-517.

Steg, and Charles Vlek. 2009. "Encouraging Pro-Environmental Behavior: An Integrative Review and Research Agenda." *Journal of Environmental Psychology* 29(3):309-317.

Stern, Nicholas. 2007. *The Economics of Climate Change. The Stern Review.* Cambridge: Cambridge University Press.

IPCC. 2007. *Climate Change 2007.* Four Volumes. Cambridge: Cambridge University Press.
Yamagishi, Toshio, Shigeru Terai, Toko Kiyonari, Nobuhiro Mifune, and Satoshi Kanazawa. 2007. "The Social Exchange Heuristic: Managing Errors in Social Exchange." *Rationality and Society* 19(3):259-291.
Zucker, Lynne G. 1986. "Production of Trust: Institutional Sources of Economic Structure: 1840-1920." Pp. 53-111 in *Research in Organizational Behavior, Vol. 8*, edited by Barry M. Staw, and Larry L. Cummings. Greenwich, London: JAI Press.

Appendix

A1: Individual Country Regression Tables

Country / Variable	Sweden	Denmark	UK	US
System Trust	0.326***	0.382***	0.324**	0.146
	(0.119)	(0.098)	(0.16)	(0.145)
Private Benefits (PB)	-0.002	0.114**	0.121	0.309***
	(-0.083)	(0.051)	(0.084)	(0.091)
Convenience of	0.439***	0.240***	0.239***	0.191**
Recycling (CR)	(0.095)	(0.057)	(0.089)	(0.095)
Interactions				
ST x PB	0.08	-0.132	-0.142	-0.216
	(0.118)	(-0.093)	(-0.178)	(-0.179)
St x CR	-0.454***	-0.303***	-0.356*	0.068
	(-0.134)	(-0.101)	(-0.185)	(0.185)
Control Variables	(insignificant variables omitted from table)			
Environmental Values	(Reference: Materialist)			
Mixed	0.007	0.058***	0.031	0.035
	(0.02)	(0.019)	(0.025)	(0.025)
Postmaterialist	0.024	0.042*	0.024	0.107**
	(0.027)	(0.023)	(0.051)	(0.052)
Age	0.003***	0.002***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
Female	0.033**	0.024*	-0.01	-0.013
	(0.014)	(0.013)	(-0.025)	(-0.024)
Income	0.037	0.057*	0.041	0.114*
	(0.029)	(0.03)	(0.057)	(0.059)
Trust Recycling	0.108***	0.057**	0.033	0.065
	(0.029)	(0.025)	(0.046)	(0.05)
Constant	0.407***	0.371***	0.121	-0.125
	(0.101)	(0.072)	(0.103)	(-0.106)
N	716	752	716	751
R^2	0.133	0.139	0.05	0.151

Notes: Method OLS. *, **, ***: p< 0.1, 0.05, 0.01, respectively (two-sided). Standard errors in parentheses.

A2: Survey Items / Variable Coding Information

Variable	Wording/Coding	Range	Mean	Std. Dev.
Recycling	How large a share of your refuse do you recycle within the following catgegories?			
Item 1	Paper/Cardboard	1-5	4.14	1.44
Item 2	Batteries	1-5	3.58	1.72
Item3	Electronics	1-5	3.67	1.66
Recycling Behavior	Mean of items 1-3, rescaled from 0 to 1			
System Trust	How much do you personally trust each of the following institutions?			
Item1	'The legal system' (11-point scale)	0–10	5.67	2.66
Item2	'Congress' (11-point scale)	0–10	4.43	2.65
Item3	'The police' (11-point scale)	0–10	6.29	2.45
Item4	'The civil services' (11-point scale)	0–10	5.24	2.34
Item5	'The government' (11-point scale)	0–10	4.14	2.77
System Trust	Mean of items 1-5, rescaled from 0 to 1	0-1	0.51	.21
Country mean of system trust	Sweden	0–1	0.51	0.19
	Denmark		0.67	0.16
	UK		0.41	0.20
	USA		0.46	0.20
Convenience of recycling (CR)	'The recycling options where I live are worse than in most other places in the US' c (5 categories; inverted and rescaled to a 0–1 range)	0–1	0.62	0.32
Private benefits (PB)	'If I couldn't recycle, it would be difficult for me to dispose of all my refuse' (5 categories; inverted and rescaled to a 0–1 range)	0–1	0.48	0.35
Generalized Social Trust				
Item1	'Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?' (11-point scale)	0–10	5.75	2.59
Item2	'Do you think that most people would try to take advantage of you if they got the chance, or would they try to be fair?' (11-point scale)	0–10	5.90	2.39
Item3	'Would you say that most of the time people try to be helpful or that they are mostly looking out for themselves?' (11-point scale)	0–10	5.45	2.33
Generalized Social Trust	Mean of items 1-3, rescaled to a range 0-1			
Country mean of generalized social trust	Sweden	0–1	0.64	0.20
	Denmark		0.68	0.18

	UK		0.45	0.21
	USA		0.47	0.22
Environmental Values	Inglehart's 4-item postmaterialism measure (cf. Inglehart 1997, Chapter 4) (3 categories represented with dummy variables)			
Age	'Please indicate which year you were born' (recoded to age in years)	18–88	0.45	13.50
Gender (*Females rel. to men*)	'Please indicate your gender' (females = 1)	0, 1	0.53	–
Educational level	'What is the highest educational level that you have attained?' (9 categories) (rescaled to a 0–1 range)a	0–1	0.65	0.27
Income	'What is the current household income before taxes?' (10 categories, rescaled to a 0–1 range)b	0–1	0.36	0.26
Ethnic majority/minority (Natives relative to immigrants)	'Finally, we would like to know if you were born in USA.' c (Natives = 1)	0, 1	0.94	–
City size	'Do you live in ...?' (['A city with 500,000 or more residents'] and so on; 5 categories represented with dummy variables; see Table 2)	–	–	–
Gender (Females rel. to men)	'Please indicate your gender' (females = 1)	0, 1	0.53	–
Educational level	'What is the highest educational level that you have attained?' (9 categories) (rescaled to a 0–1 range)a	0–1	0.65	0.27
Income	'What is the current household income before taxes?' (10 categories, rescaled to a 0–1 range)b	0–1	0.36	0.26
Ethnic majority/minority (Natives relative to immigrants)	'Finally, we would like to know if you were born in USA.' c (Natives = 1)	0, 1	0.94	–
Trust in recycling authorities (*Trust recycling*)	'You can trust that the majority of the refuse sent for recycling are actually recycled' (5 categories; rescaled to a 0–1 range)	0–1	0.63	0.26

Notes: All variables (except dummy variables) are coded so higher values signify higher recycling/trust/age/education/income/convenience etc..

a. The name and the number of categories vary between countries. The categories are the same as in the General Social Survey (US), European Social Survey (DK + SE), and European Values Study (UK).

b. The categories vary between countries but are equivalent.

c. The wording varies between countries but is equivalent.